ROTATIONAL SPECTROSCOPY OF $ClZnCH_3$ ($\tilde{X}^1A_1$): CHARACTERIZATION OF A MONOMERIC GRIGNARD-TYPE REAGENT

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The pure rotational spectrum of the organozinc halide, $ClZnCH_3$ ($\tilde{X}^1A_1$), has been measured using Fourier-transform microwave (FTMW) and millimeter-wave direct-absorption methods in the frequency range 10–296 GHz. This work is the first study of $ClZnCH_3$ by gas-phase spectroscopy. The molecule was created in a DC discharge from the reaction of zinc vapor, produced either by a Broida-type oven or by laser ablation, with chloromethane in what appears to be a metal insertion process. Rotational and chlorine quadrupole constants were determined for three zinc isotopologues. The Zn – Cl bond was found to be partly ionic and significantly shorter than in EtZnCl.